DOES ANIMAL ASSISTED THERAPY (AAT) HAVE AN EFFECT ON MOOD IN UNITED STATES VETERANS?

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Abstract

While there are many publications regarding the benefits of therapy animals in hospital settings and facilitated living, the literature is lacking in research on the beneficial effects and impact of therapy animals on the disabled veteran population. Research has shown benefit for United States veterans with service dogs and emotional support animals. This pilot study explored the effects of a single therapy dog on various aspects of mood, including depression and anxiety, in disabled veterans by incorporating five weeks of thirty-minute therapy sessions to a group of eight veterans. Results demonstrated a significant decrease in Trauma Symptom Checklist scores over the entire study interval ($P_{trend}<0.001$). The initial mean score before the study was 21, and following the five-week treatment the mean score was 4. We also found an average decrease of 10 in Beck Depression Inventory scores over five weeks with average scores of 15 initially and average scores of 3 following five weeks of treatment (p value=0.056). Although this was a small sample population, we concluded that five weeks of consecutive animal assisted therapy resulted in a general decrease in anxiety and depression, and an overall positive increase in mood as evidenced by the Beck Anxiety Inventory, Beck Depression Inventory, and Trauma Symptom Inventory scores. Further large-scale studies will need to be conducted with a higher number of participants to help support the data in this study.

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Introduction

Animal Assisted Therapy dates back to the 1940s when a United States soldier brought his Yorkshire Terrier to the hospital to visit wounded veterans. Pet Partners (formerly Delta Society), a research-based organization committed to promoting animal-based treatments around the country. They distinguish animal-assisted activities (such as provided by seeing-eye dogs to the visually impaired) from therapy, in which the emphasis is on psychological support and physical healing.

Integrative medicine founder, Dr. Andrew Weil, uses AAT in his treatment for many mood disorders, including anxiety and depression[1]. AAT has been found to reduce feelings of loneliness as well as to bring out positive social characteristics. It can also help with feelings of depression and isolation.[1]

Research suggests that comorbid anxiety and depression holds a worse prognosis than either diagnosis separately. The risk of suicide in this population is 2-5 fold higher than the general population. The veteran community has high rates of mood disorders including, but not limited to, post-traumatic stress disorder, anxiety, and depression. Current research is aimed at treating these disorders using pharmacotherapy, psychotherapy, and various forms of behavioral therapy, including animal assisted therapy.

Review of current research

A database search was conducted in PubMed, EMBASE, and MedLine using the key terms *animal assisted therapy and veterans, animal assisted interventions and veterans,* and *pet therapy and veterans* to evaluate current literature. While there are many publications regarding the benefits of therapy animals in hospital settings and facilitated living, the literature is lacking in research on the beneficial effects of therapy animals' impact on the disabled veteran population. This pilot study will look at similar factors on a distinct demographic of people. The study will also determine if there should be continued research involving Animal Assisted Therapy and the disabled veteran population.

Distinction among types of service animals

Therapy animals provide a different purpose than support animals, companion animals, and service animals; Support and companion animals are personal pets for day-to-day emotional support. Service animals provide a service for someone with a disability. For instance, a veteran can purchase a service dog for post-traumatic stress disorder. The animal has a job and has been trained from puppyhood to identify and aid the person in the event of a PTSD attack. The dog remains with the person for the duration of their life. Therapy animals are licensed to provide a temporary service of support and compassion to other people. They are often involved in Animal Assisted Therapy (AAT). AAT "uses trained animals to enhance an individual's physical, emotional and social well-being, thus improving self-esteem, reducing anxiety and facilitating healing[9]." Therapy teams consist of an animal and its handler, which is often the owner. Testing involves verifying the animal can remain calm and composed in a multitude of situations they may encounter. For example, they will be exposed to loud unexpected noises, awkward petting, hospital devices- wheelchairs, IV poles, patient beds- people with hats on, people who dress and walk differently, children, adults, shouting, and crying, and they must always obey the leave-it command. There is not a governing body overseeing AAT. Individual institutions generally have their own rules as to what animals they allow to visit their facilities, and documentation of health and current vaccination status is generally required. Organizations such as Pet Partners offer courses to facilitate the training of animals and their human counterparts.

Indications for AAT

Based on current research, AAT is broadly indicated for patients of all ages who need improvement in mood, motivation, self-esteem, and physical and psychological well-being. The medical indications for AAT include but are not limited to autism, dementia, chronic diseases, mental disorders, and neurological disorders[11].

Contraindications for AAT

It is always important to keep in mind when a therapy would be more harmful than beneficial. These include patient factors such as fear, disinterest or inability to treat the animal appropriately, as well as medical factors such as if AAT would worsen current medical condition, a patient who is immunocompromised, allergies to animals, and/or patients who have open sores or wounds.

U.S. VETS Program

U.S. VETS is part of the United States Veterans Initiative aimed at rehabilitating homeless and at-risk veterans with a mission to transition "military veterans and their families through the provision of housing, counseling, career development and comprehensive support[5]." The program consists of five locations in Phoenix, AZ. U.S. VETS serves nearly twelve hundred veterans through its services yearly.

Veterans and Depression/Anxiety

The veteran population has a higher prevalence of mood disorders compared to non-military peers. Comorbid anxiety was an important risk factor for suicide in depressed veterans[10]. It is important to identify those at risk early in order to intervene. Treatment beyond merely pharmacologic drugs should be offered. Treatment such as Animal Assisted Therapy could and should be considered along with cognitive behavioral therapy (CBT), relaxation, psychoanalytic therapy, and hypnotherapy[7].

Therapy and veterans

Although the literature is lacking when looking at AAT and its impact on veterans, data supports the benefit and positive impact of service animals and psychologically disabled veterans. The VA states dogs can aid reserved and guarded veterans interact with normal daily tasks, such as crowds, strangers, and public spaces. They go on to discuss the opportunity to experience and express love while overseeing an animal's training and wellbeing is beneficial[8].

Therapy animals and mood

Therapy animals have been shown to be beneficial to the mood of many subsets of people, including but not limited to those in hospitals, nursing homes, schools, and victims of tragic events. [3] "Research has demonstrated that animals have a calming effect, reducing blood pressure and anxiety. They tend to make people less lonely and bring out positive social characteristics. Many hospitals and nursing homes use AAT programs to help reduce feelings of depression and isolation in their patients as well as stimulating mental activity through interaction with the animal"[3].

Therapy animals and hospitalized patients

Animal-assisted therapy improves cardiopulmonary pressures, neurohormone levels, and anxiety in patients hospitalized with heart failure [6]. It is postulated that these can be extrapolated across various demographics and in various settings such as clinics, rehab facilities, and outpatient treatment centers.

Forms

The Trauma Symptom Checklist-40 (TSC-40) is a validated 40-item self-report measure of distress in adults. Participants are asked to rate how often they have experienced each symptom in the last two months using a 4-point frequency rating scale ranging from 0 ("never") to 3 ("often"). The score range is 0-120. Higher scores correlate with greater abuse. However, there is no specific numerical cutoff for severity range. The measure includes six subscales: Anxiety, Depression, Dissociation, Sexual Abuse Trauma Index, Sexual Problems, and Sleep Disturbance. The measure is intended for use in research. The test can be taken an unlimited number of times and requires a quarter of an hour to complete.

The Beck Depression Inventory®-II (BDI®-II) and the Beck Anxiety Inventory® (BAI®) are widely used and validated 21-item self-report screening measures of depression and anxiety respectively to be used in research or for medicinal treatment purposes[3-4]. These measures allow variables of mood to be plotted over time. The tests can be taken an unlimited number of times and require five minutes to complete. The BDI®-II is validated for ages 13-80 with a

sensitivity of 81% and specificity of 92%. Participants are asked to rate how often they have experienced each symptom in the last two months using a 4-point frequency rating scale ranging from 0 ("never") to 3 ("often"). The score range is 0-63 with a score breakdown seen below:

0-10 These ups and downs are considered normal

11-16 Mild mood disturbance

17-20 Borderline clinic depression

21-30 Moderate depression

31-40 Severe depression

over 40 extreme depression

The BAI® is approved for ages 17-80. It maintains a sensitivity of 90% and a specificity of 75%. Participants are asked to indicate how much they have been bothered by that symptom during the past month using a 4-point frequency rating scale ranging from 0 (“not bothered at all”) to 3 (“severely=it bothered me a lot”). The score range is 0-84 with a score breakdown seen below:

Score of 0-21 = low anxiety

Score of 22-35 = moderate anxiety

Score of 36 and above = potentially concerning levels of anxiety

Materials and Methods

Subjects and Informed Consent

The IRB reviewed and approved the project. Eight research subjects were enrolled based on their status as U.S. VETS members of the permanent housing community in Phoenix, Arizona. The enrollment was open to all permanent housing members. Eight were chosen due to the nature of the therapy encounter and the maximum time limit implemented for therapy dog visits (maximum 2 hours per site visit).

Informed consent was obtained and included agreement to partake in weekly, thirty-minute therapy sessions proctored by a designated therapist, accompanied by a therapy dog and handler. The subject filled out a Trauma Symptom Checklist at the beginning and end of the five-week trial, as well as a BDI-II® and BAI® following each session.

Prospective Study

Data was collected and analyzed based on outcomes of the pilot study.

Assessment Measures

A baseline Trauma Symptom Checklist-40 was administered to all eight subjects at the beginning of the five weeks. The Beck Depression Inventory® and Beck Anxiety Inventory® was administered following each session for the five weeks. The results were analyzed using Statistical Analysis Software offered through University of Arizona College of Medicine-Phoenix to determine statistical significance for the pilot study.

Nature of the sessions

The individual therapy sessions lasted for thirty minutes each. Jonnie Arnold, Psy.D proctored each therapy session. The therapy dog was present for the eight sessions over five weeks. The dog was most often next to the subject in order to be accessible for petting, comfort, and support.

Statistical Analysis

Data was converted and assessed based on the statistical program offered through the University of Arizona College of Medicine- Phoenix. Data was deemed significant/not significant or correlated/not correlated based on p value. The n value for subjects is very low, so future large-scale studies will be required.

Results

BDI scores trended down

The overall outcome of BDI scores indicated a general decrease over five weeks (p value=0.056). This was evaluated based on the mean of all individual scores from the Beck Depression Inventory, which can be seen in the second column of Table 1.

BAI scores remained at baseline

As seen in Figure 2. there was no significant decrease in BAI scores over the five weeks (Ptrend=0.78). This was evaluated based on the mean of all individual scores from the Beck Anxiety Inventory, which can be seen in the second column of Table 1.

TSC scores decreased from the initial evaluation to the final evaluation.

The TSC scores demonstrated a significant decrease over the entire study (Ptrend<0.001). The scores were plotted based on the mean of all individual scores, which can be seen in the third column of Table 1.

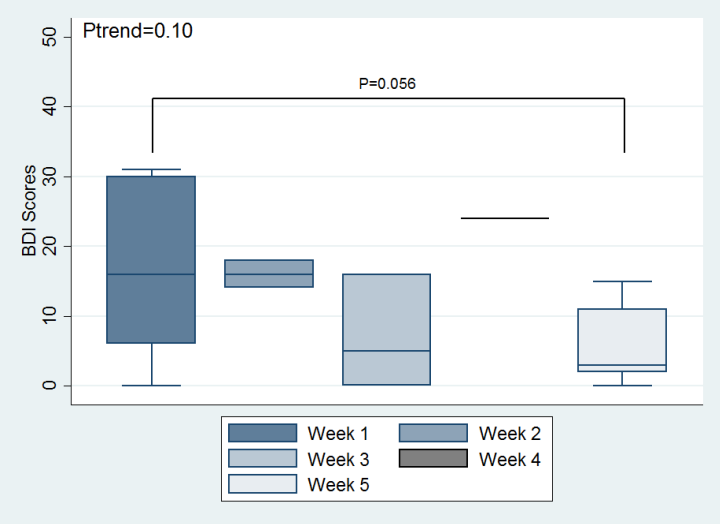

Figure 1. The mean of individual BDI scores over five weeks of therapy

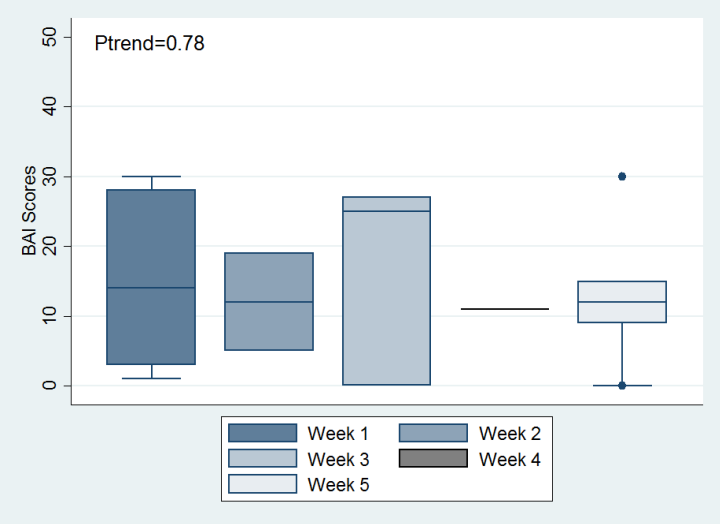

Figure 2. The mean of individual BAI scores over five weeks of therapy

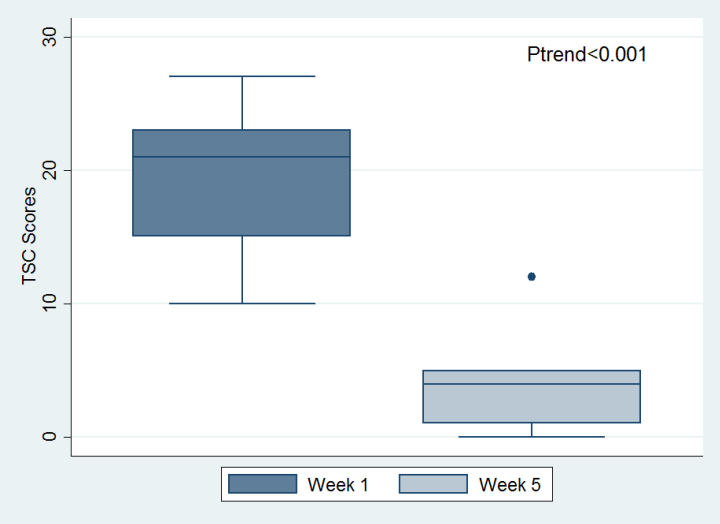

Figure 3. The mean of individual initial and final TSC scores over five weeks of therapy.

Table 1. Mean BDI, BAI, and TSC scores in participants over five weeks.

	BDI	BAI	TSC
Time Points (Weeks)	Mean (SD)	Mean (SD)	Mean (SD)
1	16.6 (13.9)	15.2 (13.6)	19.2 (6.72)
2	16.0 (2.82)	12.0 (9.89)	
3	7.0 (8.18)	17.3 (15.0)	
4	24.0 (N/A)	11 (N/A)	
5	6.2 (6.45)	13.2 (10.9)	4.40 (4.72)

Table 2. Beta value of measure outcome scores over time for the individual score means for the BDI, BAI, and TSC respectively.

Beta (95% CI) calculated using Linear Mixed Model

Outcome		Beta (95% CI)	P-value	P_{Trend}
BDI				
Time				
	1	REF		
	2	-0.60 (-14.1, 12.9)	0.93	0.10
	3	-9.6 (-21.8, 2.18)	0.11	
	4	7.4 (-10.3, 25.1)	0.41	
	5	-10.5 (-20.6, -0.19)	0.046	
BAI				
Time				
	1	REF		
	2	-3.20 (-20.4, 14.0)	0.71	0.78
	3	2.13 (-12.9, 17.2)	0.78	
	4	-4.20 (-26.7, 18.3)	0.71	
	5	-2.0 (-15.0, 11.0)	0.76	
TSC				
Time				
	1	REF		<0.001
	5	-14.8/ (-21.2, -8.34)	<0.001	

Discussion

This pilot study explored the effects of a single therapy dog on various aspects of mood, including depression and anxiety, in disabled veterans by incorporating five weeks of thirty-minute therapy sessions to a group of eight veterans. Results demonstrated a significant decrease in Trauma Symptom Checklist scores over the entire study interval ($P_{trend}<0.001$). The initial mean score before the study was 21, and following the five-week treatment the mean score was 4. We also found an average decrease of 10 in Beck Depression Inventory scores over five weeks with average scores of 15 initially and average scores of 3 following five weeks of treatment (p value=0.056). Although this was a small sample population, we concluded that five weeks of consecutive animal assisted therapy resulted in a general decrease in anxiety and depression, and an overall positive increase in mood as evidenced by the Beck Anxiety Inventory, Beck Depression Inventory, and Trauma Symptom Inventory scores. The information gathered provides initial insight into the positive effect of therapy dogs on the United States veteran population.

The participants were not chosen based on the presence of depression and anxiety. Therefore, if a participant did not have depressive or anxious symptoms prior to therapy, the thought is there would be generally no change with the animal's presence. For these participants, the more predictive indicator is the Trauma Symptom Checklist because of the comprehensive nature of the form.

Week four data was limited because only two of the eight participants filled out the survey. This may have skewed the data for that time point. It did not appear to affect the overall trend of the data measure scores.

The mean of the individual Beck Depression Inventory scores dropped over time with the greatest decrease between the initial visit, week one, to the final visit, week five. There was no significant change at week two. Week four actually indicated an increase in BDI scores from week one. The scores for week four may be attributed to the discrepancy in participants filling

out the forms for that week because there was a substantial decrease fin BDI scores at week five.

The mean of the individual Beck Anxiety Inventory scores did not significantly change over the five weeks. Literature demonstrates that anxiety symptoms require longer interventions to modify, with the average treatment time being six months to one year, while depressive symptoms are more amenable to shorter, temporary interventions.[7] Further studies that take place over a longer period of time may be required to evaluate the effect on anxiety.

The Trauma Symptom Checklist Scores demonstrated the most significant decrease for this study ($p<0.001$). The results indicate that animal assisted therapy intervention in the disabled veteran population is beneficial and related to an increase in overall mood.

The results of the study could be due to several factors including animal interaction, community interaction, or having an impartial third-party interaction. Whatever the reason may be, depression scoring was noted to decrease and overall mood, as measured by the TSC, was noted to increase over the five-week period.

Limitations

A limiting factor of this study was the small sample size. Based on the one handler-animal team and the two-hour maximum limit for visitation per visit, only eight participants were able to partake in the research.

Another limiting factor of this study was the gender of the veterans. They were all male. Different ages and races were represented within the small sample size.

This study strictly investigated one treatment intervention for mood, depression, and anxiety in United States veterans. Changes in medications and other treatment modalities were not analyzed. Future research could account multiple treatment modalities.

Future Studies

Future studies have the potential to involve longer time intervals, larger sample size, and more therapy animals for the therapy sessions. They could also look at the effect before and after therapy- have patients rate their mood immediately before and after the sessions.

In addition, further studies have the potential to investigate the effect of therapy animals on pain perception in United States Veterans. Marcus et al reported that clinically significant pain improvement (>2 points pain severity reduction) was found in patients with fibromyalgia when visiting a pain clinic versus 4% in the control group. [6]

References

1. Weil, Andrew. “Animal Assisted Therapy.” https://www.drweil.com/health-wellness/balanced-living/wellness-therapies/animal-assisted-therapy/
2. Elliot & Briere. “Trauma Symptom Checklist-40”. U.S. Department of Veteran Affairs. 1992. https://www.ptsd.va.gov/professional/assessment/adult-sr/tsc-40.asp
3. “Beck Depression Inventory”. Pearson Clinical. https://www.pearsonclinical.com/psychology/products/100000159/beck-depression-inventoryii-bdi-ii.html
4. “Beck Anxiety Inventory”. Pearson Clinical. https://www.pearsonclinical.com/psychology/products/100000251/beck-anxiety-inventory-bai.html?origsearchtext=100000251
5. “U.S. VETS”. https://www.usvetsinc.org/phoenix/
6. Marcus DA, Berstein CD, Constantin JM, et al. Impact of Animal Assisted Therapy for Outpatients with Fibromyalgia. *Pain Medicine.* 2013 Jan; 14(1): 43–51.
7. Cottraux, Jean. “Nonpharmacological treatment for anxiety disorders.” *Dialogues in Clinic Neuroscience.* 2002 Sep; 4(3): 305-319
8. Weinmeyer, Richard. Service Dogs for Veterans with Posttraumatic Stress Disorder. *AMA Journal of Ethics.* 2015;17(6):547-552.
9. Pet Partners of Southern Arizona. http://www.therapyanimalsaz.org/Links.html accessed 2/19/2016
10. Pfeiffer PN, Ganoczy D, Ilgen M. Comorbid Anxiety as a Suicide Risk Factor Among Depressed Veterans**.** *Depress Anxiety.* 2009; 26(8): 752–757.
11. Morrison, Michele. “Health Benefits of Animal Assisted Therapy Interventions.” *Journal of Evidence-Based Integrative Medicine.* 2007, Jan; http://chp.sagepub.com/content/12/1/51